Claims

1. A twin-drum continuous casting apparatus for casting a metal sheet by supplying molten metal to a pouring basin formed by a pair of cooling drums rotating in opposite directions, and side gates, to cool the molten metal by contact with surfaces of the cooling drums, thereby forming a solidified shell, characterized in that

the cooling drum is formed from a drum body having shaft portions at opposite end portions, and a drum sleeve fitted on an outer peripheral portion of the drum body, and

means is provided for preventing various adverse influences due to differences in thermal expansion of constituent members of the drum body during casting.

2. The twin-drum continuous casting apparatus of claim 1, characterized in that

the drum body is formed from, and divided into, a pair of shaft members having the shaft portions provided integrally therewith and being joined to end portions of the drum sleeve, and a core member located between the shaft members and shrink fitted to an inner peripheral surface of the drum sleeve without contacting the shaft members.

3. The twin-drum continuous casting apparatus of claim 2, characterized in that

in shrink fit between the drum sleeve and the core

member supporting the drum sleeve from inside, a tightening margin at an intermediate portion in a drum axis direction is greater than a tightening margin at the end portion.

4. The twin-drum continuous casting apparatus of claim 2, characterized in that

a wall thickness of the intermediate portion in the drum axis direction of the core member supporting the drum sleeve from inside is larger than a wall thickness of the end portion.

5. The twin-drum continuous casting apparatus of claim 2, characterized in that

the end portions of the drum sleeve and the shaft members are fastened together by bolts.

6. The twin-drum continuous casting apparatus of claim 1, characterized in that

many hot water channels, each extending in a drum axis direction along joining surfaces of the drum body and the drum sleeve, are formed at least within the drum body at predetermined intervals in a circumferential direction.

7. The twin-drum continuous casting apparatus of claim 6, characterized in that

supply and discharge of hot water into and from the hot water channels are performed via hot water jackets

formed along an inner surface of the drum body in order to heat the inner surface of the drum body.

8. The twin-drum continuous casting apparatus of claim 6, characterized in that

cooling water, which has flowed through a cooling water hole of the drum sleeve and turned into hot water upon heat exchange, is supplied to the hot water channels.

9. The twin-drum continuous casting apparatus of claim 6, characterized in that

hot water is supplied to the hot water channels before start of casting to preheat the drum.

10. The twin-drum continuous casting apparatus of claim 1, characterized in that

the drum body is made of SUS, the drum sleeve is made of a Cu alloy, and the SUS drum body is composed of a plurality of ring-shaped core members arranged dividedly at intervals in an axial direction.

11. The twin-drum continuous casting apparatus of claim 10, characterized in that

the Cu alloy drum sleeve is composed of a 60 to 100 mm thick sheet.

12. The twin-drum continuous casting apparatus of claim

10, characterized in that

of the plural core members provided dividedly, the core members located at opposite end portions of the drum body have axial end surfaces to which drum shafts are fixed, and have circumferential surfaces, which are fitted to the Cu alloy drum sleeve, formed so as to be wider than circumferential surfaces of the core members at an intermediate portion of the drum body, and the core members arranged in the intermediate portion each have a convex small-width portion on a circumferential surface thereof, the convex small-width portion being fitted to the Cu alloy drum sleeve.

13. The twin-drum continuous casting apparatus of claim 1, characterized in that

outer layer water channels are provided in the drum sleeve, inner layer water channels are provided in the drum body, cooling water is supplied to the outer layer water channels and the inner layer water channels, a measuring device is provided for measuring a temperature of cooling water discharged from the inner layer water channels, and a control device is provided for controlling a temperature of cooling water supplied to the inner layer water channels in accordance with the cooling water temperature from the measuring device.

14. The twin-drum continuous casting apparatus of claim

1, characterized in that

outer layer water channels are provided in the drum sleeve, inner layer water channels are provided in the drum body, cooling water is supplied to the outer layer water channels and the inner layer water channels, a measuring device is provided for measuring a profile in a plate width direction of the metal sheet delivered from the cooling drums, and a control device is provided for controlling a temperature of cooling water supplied to the inner layer water channels in accordance with the profile from the measuring device.

15. The twin-drum continuous casting apparatus of claim 1, characterized in that

outer layer water channels are provided in the drum sleeve, inner layer water channels are provided in the drum body, cooling water is supplied to the outer layer water channels and the inner layer water channels, measuring devices are provided for measuring a temperature of cooling water discharged from the inner layer water channels, and a profile in a plate width direction of the metal sheet delivered from the cooling drums, and a control device is provided for controlling a temperature of cooling water supplied to the inner layer water channels in accordance with the cooling water temperature and the profile from the measuring devices.

16. In a twin-drum continuous casting apparatus for casting a metal sheet by supplying molten metal to a pouring basin formed by a pair of cooling drums rotating in opposite directions, and side gates, to cool the molten metal by contact with surfaces of the cooling drums, thereby forming a solidified shell, a twin-drum continuous casting method characterized by

forming the cooling drum from a drum body having shaft portions at opposite end portions, and a drum sleeve fitted on an outer peripheral portion of the drum body, and

implementing means for preventing various adverse influences due to differences in thermal expansion of constituent members of the drum body during casting, said means being such that

many hot water channels, each extending in a drum axis direction along joining surfaces of the drum body and the drum sleeve, are formed at least within the drum body at predetermined intervals in a circumferential direction, and

supply and discharge of hot water into and from the hot water channels are performed via hot water jackets formed along an inner surface of the drum body in order to heat the inner surface of the drum body.

17. The twin-drum continuous casting method of claim 16, characterized in that

cooling water, which has flowed through a cooling

water hole of the drum sleeve and turned into hot water upon heat exchange, is supplied to the hot water channels.

18. The twin-drum continuous casting method of claim 16, characterized in that

hot water is supplied to the hot water channels before start of casting to preheat the drum.

19. A twin-drum continuous casting method comprising:

providing outer layer water channels in a portion of each of cooling drums along a circumferential surface of the cooling drum;

providing inner layer water channels inwardly of the outer layer water channels; and

casting a metal sheet while supplying cooling water to the outer layer water channels and the inner layer water channels, and characterized by:

measuring a temperature of cooling water discharged from the inner layer water channels; and

controlling a temperature of cooling water supplied to the inner layer water channels in accordance with the measured temperature, thereby controlling crown of the metal sheet.

20. A twin-drum continuous casting method comprising:

providing outer layer water channels in a portion of each of cooling drums along a circumferential surface

of the cooling drum;

providing inner layer water channels inwardly of the outer layer water channels; and

casting a metal sheet while supplying cooling water to the outer layer water channels and the inner layer water channels, and characterized by:

measuring a profile in a plate width direction of the metal sheet delivered from the cooling drums; and

controlling a temperature of cooling water supplied to the inner layer water channels in accordance with the measured profile, thereby controlling crown of the metal sheet.

21. A twin-drum continuous casting method comprising:

providing outer layer water channels in a portion of each of cooling drums along a circumferential surface of the cooling drum;

providing inner layer water channels inwardly of the outer layer water channels; and

casting a metal sheet while supplying cooling water to the outer layer water channels and the inner layer water channels, and characterized by:

measuring a temperature of cooling water discharged from the inner layer water channels, and a profile in a plate width direction of the metal sheet delivered from the cooling drums; and

controlling a temperature of cooling water supplied

to the inner layer water channels in accordance with the temperature of cooling water and the profile, thereby controlling crown of the metal sheet.